F Tank Farm

Tour Script

Entrance and Safety Issues

During our tour, please watch your step, as there are potential tripping hazards such as uneven pavement, rocks, hoses and extension cords that may be in our walking path. Also, when ascending or descending stairs, please use the handrails. In the event of an alarm or evacuation announcement, please follow your tour guide to the designated rally point. We will be entering a Controlled Area but will not enter any radiation or contamination area. There will be no radiological monitoring required to exit the area at the completion of the tour. Please ensure you do not reach across any established boundary during this tour. Our tour will take us by the 241-16F Evaporator, Type IIIA Waste Tanks, Type I Waste Tanks, The Waste on Wheels Process, Type IV Waste Tanks, and the 1F Evaporator. Please follow me to the first stopping point.

Waste Categories

The waste that is currently stored in the waste tanks was received primarily from the F-Canyon process. This liquid waste received from the canyon is referred to as supernate. Supernate is an aqueous mixture of soluble salts and insoluble components. As the supernate sits in the waste tanks, the insoluble components separate from the water and

settle to the bottom of the tank. This is called sludge. To reduce the amount of liquid waste contained in the waste tanks, the supernate is processed through an evaporation process. The by-product of the evaporation process is called saltcake. In summary, the waste in the tank farms can be categorized into three groups: supernate, sludge, and saltcake.

Waste Tanks

We will now discuss the Type III Waste Tanks. On your left and right are Tanks 25 and 44 (point at each waste tank). As you can see, Tank 25 has had infrastructure added to the tank top for waste removal activities and Tank 44 is still in its original design. There are 27 Type III tanks located at F and H-Tank Farm that were built between 1967 and 1981. They each have a 1.3 million gallon capacity and are 85 feet in diameter by 33 feet high. The Type III waste tanks have a full height secondary containment and leak detection systems. The main components of a Type III waste tank and associated systems are:

- The primary tank or shell is the component of the waste tank that actually contains the liquid waste.
- The secondary containment, which surrounds the shell of the waste tank, provides a location for collecting any leakage from the primary tank. This area is called the annulus.

- The tanks contain numerous cooling coils located in the primary part of the tank. The cooling coils provide a means of cooling the tank contents.
- Each tank is equipped with a primary ventilation system. The system is designed to remove hydrogen and organic vapors from the waste tank vapor space while preventing the release of radionuclides to the environment.
- Each tank is equipped with an annulus ventilation system. The purpose is to prevent the accumulation of condensation within the annulus space.
- In addition, waste tanks are equipped with level measurement devices, conductivity probes for leak detection, hydrogen monitors, radiation monitors, transfer pumps, and waste mixing devices.

241-16F Evaporator

The large structure you see in the distance (point to the evaporator) is the 241-16F evaporator, which will be referred to as the 2F evaporator for the remainder of this discussion. The primary function of the 2F evaporator is to recover tank space through evaporation to support sludge and Canyon waste processing. The boiling action in the evaporator causes the liquid to separate from the waste. The separation of the liquid from the waste reduces the volume to approximately 25%-30% of its original volume. To obtain this waste volume reduction, it usually takes processing the waste three to four cycles through the evaporator. The 2F Evaporator requires scheduled and some unscheduled maintenance activities throughout the year. These activities can be minor in nature such as inspecting the evaporator pot, minor steam leak repairs or

instrumentation calibration or replacement. The current evaporator pot has been in service since approximately 1990. The life expectancy of an evaporator pot is approximately 10 years. There is a replacement pot ready for installation when the current pot fails. This would be an example of a major maintenance outage.

The basic operation of the evaporator system is to receive waste from the feed tank, currently Tank 26 (point in the direction of Tank 26). The waste is transferred through an underground transfer line into the evaporator pot by a feed pump. The waste in the evaporator is boiled using 150 pound steam and is separated into vapor and concentrated liquid. The boiled off liquid contents, referred to as overheads is then transferred to the Effluent Treatment Project for final processing and eventual permitted release to the environment. The concentrated liquid is transferred out of the evaporator pot and drains to a concentrate receipt tank, currently Tank 27 (point to Tank 27). As the concentrate receipt tank reaches its fill limit, the waste is transferred back to the feed tank, Tank 26 and the process is repeated. This is how the 25-30% waste reduction is obtained. We will now proceed to the Type I waste tanks and the Waste on Wheels process.

Type I Waste Tanks (Point out Tanks 5 & 7, Tanks 6 & 8 behind those respectively)

Between the F and H Tank Farms, there are 12 Type I tanks. They were built between 1952 and 1953. They each have a 750,000 gallon capacity and are 75 feet in diameter by 24-1/2 feet high. These tanks have a partial secondary containment for leak collection which has a leak detection system to provide notification of a leak into the secondary

containment boundary. All other components are similar to the Type III waste tanks discussed earlier.

We are currently in sludge waste removal operations for Tanks 5 and 6. The sludge is being transferred to Tank 7 for eventual disposal at the Defense Waste Processing Facility. This process involves the installation of mixing and transfer pumps, which is part of the Waste on Wheels technology. Older technology used the mixing pump design you see on Tank 7 (point to Tank 7). They are the pumps with the orange motor on top. In order to remove the sludge, the waste is mixed to suspend the sludge in the liquid and the liquid is transferred to a receiving tank. The transferred waste sits in the receipt tank and the sludge settles to the bottom of the tank. The supernate is then transferred back out of the tank leaving the sludge.

The Waste on Wheels or WOW technology is the system being used for Tanks 5 and 6. This is a mobile system of pumps and support equipment that can be moved from tank to tank to enable sludge waste removal. The main components of the WOW system are the Mobile Control Center, portable power supply unit, submersible mixer pumps or SMP's, and submersible transfer pumps. This process is different from what has been used in the past because the pumps are submersible. The motor is down in the waste, and the waste is used to cool the motor. There is no rotating, long shaft on these pumps, so these pumps can be used on several tanks before they reach the end of their projected life span. In addition, they are floor-mounted versus mounted on the tank top; resulting in less infrastructure. All the infrastructure you see on Tank 7 is not required for the WOW

pumps. This system was first deployed on Tank 5 (point to Tank 5). At the completion of Tank 5 activities, the pumps were removed and are currently installed in Tank 6. This is a picture of a SMP deployed in a waste tank. As you can see, there is no visible pump motor. All the infrastructure you see was preexisting and is not needed to support the pump. The new Mobile Control Center or MCC (point to the MCC) can power two transfer pumps and four SMP's. This equipment will enable WOW to initiate closure activities on two tanks simultaneously and independently of other tank farm operations. We will now proceed to the Type IV waste tanks.

Type IV Waste Tanks (Walk down through 4 pack and point out Tank 20 as operationally closed – proceed up the hill)

There are 8 Type IV waste tanks (4 located in F-Tank Farm and 4 located in H-Tank Farm) that were built between 1958 and 1962. Two of the eight tanks, 17 and 20, are operationally closed. This process involved removing the waste to the maximum extent practical, isolating the tanks inlet/outlet capabilities, and filling them with grout and cement. This process was completed in 1997. Tanks 18 and 19 (point to 18 and 19) are currently in the process of tank closure. The final details are still being worked out with the South Carolina Department of Health and Environmental Control and the Nuclear Regulatory Commission.

As stated earlier, these tanks were built between1958 and 1962. They each have a 1.3 million gallon capacity and are 85 feet in diameter by 34 feet high with a domed concrete

roof. In addition, dirt covers the concrete dome that is used for radiation shielding. This type of tank does not have a secondary containment nor do they contain the thousands of feet of cooling coils as the other type of waste tanks. All other components are similar to the Type III waste tank components earlier discussed.

The line on the catwalk infrastructure was used for filling the waste tanks 17 and 20 with grout and planned for future use. The grout plant will be located outside the fenced area and the line you see is used for transferring the grout to the waste tank. As you can see, the grout transfer line is positioned over Tank 19 and is ready for use once we receive the authorization to proceed. The structure in the middle of the waste tanks is the 1F Evaporator. This evaporator was placed in service during the early 60's and was shutdown in 1988. Closure plans still need to be developed and approved for this evaporator.

Removal of the superstructure to support area closure is not part of this scope of work.

F Canyon (point out) – F Canyon is deactivated, and only minor surveillance and maintenance activities are performed. Behind F Canyon Facility is the MOX facility.

Mock-up Facility (point out) – This facility supports DWPF. These are not part of Liquid Waste System or this acquisition scope of work.

This concludes our tour of F-Tank Farm.